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the healthy ear in dogs which had been made absolutely deaf of their other ear, and then observed their hearing powers by means of the different notes of organ pipes between  $c$  and  $c''''$ . On the third day after the immediate consequences of the operative interference had disappeared, it was found that the dogs responded perfectly to the notes  $c''''$ ,  $c'''$ ,  $c''$ ,  $c'$ , but were deaf to the deeper notes. This condition remained unaltered for weeks, and when the animal that had been the subject of experiment was killed, post-mortem examination showed that the top only of the cochlea had been wounded, and that the filaments of the auditory nerve that were distributed to that portion were destroyed. Less precise were the results of the experiments in which the lower part of the cochlea was destroyed; in these cases absolute deafness occurred in a succession of cases; in other cases again, the dogs responded to high as well as to low notes, to the latter perhaps a little better; and again, in other cases, on the other hand, the dogs only responded to the notes  $c$ ,  $c'$ ,  $c''$ , while they were deaf to the higher notes. But this condition only lasted some fourteen days; their hearing power for the higher notes set in again, and soon reached the same sensitiveness as that for the deep notes. Post-mortem examination showed in these various cases different degrees of distinction occasioned by the operation. Herr Baginsky believes that he has by his experiments, in particular by the results of lesion of the top of the cochlea, verified experimentally for the mammalian cochlea the hypothesis of von Helmholtz.—*Nature*.

### PSYCHOLOGY.

HABITS OF THE BEAVER.—When I read Mr. Collins's story of beaver life in Nova Scotia during the last shooting season, I was pleased beyond expression. Here was something new, neither old hash nor guess work; here was a picture of inner life, life at home, worth all that had been previously written of the animal. I could almost see him come out in the twilight, look over his ruined house, and then set to work to restore it. I could see him lay and relay the sticks of which it was composed, working till back and shoulders ached, and then sitting up a moment to rest.

But the larger work on the dam just below was missed, a blank in natural history it is our luck to fill out, "acknowledging in, etc.," that the whole merit belongs to a sportsman naturalist, who seems, as you will see, under the circumstances of the case, to have "risen from savage to civilized life." A few days after reading Mr. Collins's narrative, I was agreeably surprised by a visit from an old friend and pupil, George Daniels, who had spent the past summer preparing subjects in the State Cabinet of Kansas. Research for that purpose led him to the adjoining Indian Territory, where he found undisturbed beaver communities among other developments of animal life. Securing three speci-

mens for the State Cabinet, the desire inculcated in his first lessons in natural history became imperative, demanding verification. Here was an opportunity to reach the inner life of an animal whose works had been repeatedly described as exhibiting human intelligence, but whose method and manner of accomplishment no one had seen.

With two assistants the dam of an undisturbed family was broken down to the bottom, displacing a large log which formed its base. Then with jeers at his "dam foolishness" his companions returned to camp; while he, secreted in the bushes close by, awaited the result.

He says: "At early twilight five beavers came out from holes in the bank and looked the devastation all over. 'Their capacity could not reach the cause, they only saw effects.' The first effort was to get back to its place the bed log. It was wet, heavy and slippery, their united strength could hardly move it, so that after tugging a quarter of an hour it was abandoned. They then went down the stream, gathering up the sticks of the old dam; the smaller ones were held above the water, the larger ones towed up, the beaver holding by the teeth and swimming by its side.

"There was standing on the bank directly above the dam, a willow tree some twenty inches in diameter. They all gathered about this tree, one on the upper side, all the others on the lower side next the dam. Those below them applied their teeth to the trunk like great gouges, all in turn as one became tired, so that in less time than a man with an axe would have done it, the tree tottered to its fall. All at once withdrew from the lower side, while the 'master mechanic' began cautiously to cut away the remaining support, this was done, cutting a little here and a little there, often looking upward, so that the tree fell with a crash squarely upon and across the crevice in the old dam. The tree was held several feet above the dam by its branches, and the beavers all disappeared in the water. I could not see what they were doing, but the tree began to settle and soon rested on the dam. They had cut off the branches which held it up.

"Then commenced the process of closing the breach. A beaver would draw up a fair 'cordwood' stick upon the dam, raise it on end, hugging it against his shoulder and neck, letting it slide diagonally up stream, leaning back against the fallen tree. In the meantime a beaver at the bottom was digging a 'post hole' and guiding the post to its place. When this was done the digger would come to the surface to breathe, while the one on the log would cut off the stick if too long for fair work. When the sticks of the old dam were all used, they would go into the bushes and soon return, backing out and dragging along a stick, which was placed in the same manner. This was repeated until the whole gap was filled. The process of covering this woodwork with earth, leaves, bog or whatever came to hand,

was done precisely as Mr. Collins described, hugging a mass against chin and neck, and swimming with hind feet and tail. And thus, forgetful of time, I watched with absorbing and often with almost breathless interest, the progress of the work, so that when darkness faded into daylight the dam was completed, the tired workers had retired, and I left for camp, repeating the resolution, 'I have killed my last beaver, the very last.'"

This is the point where the sportsman and naturalist rose from savage to civilized life.

There occurs here a question for the philosophic naturalist to settle as best he may. What was the medium of communication that made such unity of purpose and such union of effort in the accomplishment? The position of the old beaver above the tree indicated leadership, but no order, by word or sign, was given; all seemed to know what to do, and just how and when to do it.

The felling of a tree across a stream and building a dam against it, is one thing; felling a tree so it should not vary a foot from a given line, the old dam, showed an engineering skill you may possess, but which I should hesitate to assume. We must define instinct as directing a few things without forethought or previous knowledge, and repeating the same methods ever afterward. The bee builds the same cells, of the same material forever. The first and the last nest of the bird are precisely alike, and animals which dig holes in the earth have each a fashion peculiar to themselves, which does not vary; even the acquisitiveness of the ground squirrel is no thought for the morrow, since he hoards in the spring with all the industry of autumn.

But the beaver goes far beyond this. Instinct is overlapped by reason until separation is impossible, and all division lines are obliterated. He selects with engineering skill the site for a dam, then builds of such material as is at hand and of such shape as the exigences require, varying both as circumstances indicate; and conducting all with a degree of intelligence that treads closer upon the heels of humanity than that of any other creature living. Why an animal so gentle, so harmless, should be left outside the pale of civilized life, denied human association by clumsy form and unseemly personal habits, is one of the mysteries in nature not yet solved, but such is the fact. To him the step of civilization is simply and inevitably annihilation.—*B. Horsford, in Forest and Stream.*

THE STRIPED SQUIRREL "PLAYING 'POSSUM."—Mr. E. E. Fish records, in the Bulletin of the Buffalo Naturalists' Field Club, the fact that the striped squirrel (*Tamias striatus*) when caught alive, will often lie limp and apparently lifeless, till its captor, thrown off his guard, makes the opportunity for his escape possible, when the sly creature will scamper off with a sharp chitter of delight. It is well known that the gray squirrel, when hunted, will run up to the tops of tall trees and cling so closely to the

trunk of the tree that, aided by its color, which so closely assimilates it to the bark of hard-wood trees, it is difficult for an unpracticed eye to detect it. The chipmunk has the same habit in a less degree.

THE ENGLISH SPARROW "PLAYING 'POSSUM."—In the same note Mr. Fish relates the following case: "Among the birds, only the English sparrow have I known to make use of this subterfuge. One morning I saw four or five of these little pugilists engaged in a terrific fight among themselves. They had pecked and hammered one another in the slushy snow, and appeared reckless of surroundings. I stepped up quietly and with a quick movement caught one of them before he could rise to fly. He immediately put on the appearance of death and lay in my hand on his side, motionless and, as I supposed, lifeless. I smoothed his soiled plumage and stretched out his wings to examine the quills, feeling pity for the little fellow's untimely 'taking off,' killed in a brawl. I had gone a block to Pearl street, in which were large elms, when all at once, as if by magic, the little rascal straightened up and, like a flash, darted out of my hand and flew to the top of one of the highest trees, where he trimmed his disheveled feathers and regarded me with a quizzical look, seemingly well satisfied with the trick he had played me."

SENSE OF DIRECTION IN ANIMALS.—The remarkable faculty which cats, dogs, pigeons and other animals possess of returning in a straight line to a point of departure, has awakened much curiosity on the part of naturalists. Some refer it to instinct, some to intelligence similar to that of man, some to an internal mechanism which makes the animals simply automata; but none of these attempted explanations do anything towards solving the mystery. Wallace supposed that when an animal is carried to a great distance in a basket, its fright makes it very attentive to the different odors it encounters on the way, and that the return of these odors, in inverse order, furnishes the needful guide. Toussenel supposes that birds recognize the north as the cold quarter, the south as the warm, the east (in France), as the dry, and the west as the moist. Viguiér, in the *Revue Philosophique*, publishes an original memoir upon the sense of orientation and its organs, in which he attributes the faculty to a perception of magnetic currents.—*Journ. Roy. Microscopical Society*.

#### ANTHROPOLOGY.<sup>1</sup>

ANTHROPOLOGY AT THE AMERICAN ASSOCIATION.—The Section of Anthropology was organized with Professor Otis T. Mason, vice-president, in the chair, and Professor George H. Perkins, of Vermont, as secretary. The vice-presidential address on the

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